Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Revision of Part 15 of the Commission's Rules to	)	
Permit Unlicensed National Information	)	ET Docket No. 13-49
Infrastructure (U-NII) Devices in the 5 GHz Band	)	

To: The Commission

COMMENTS OF
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION

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TABLE OF CONTENTS

SUMMARY

The Wireless Internet Service Providers Association ("WISPA") submits these Comments to demonstrate strong support for the Commission's proposals to increase the amount of unlicensed spectrum in the 5 GHz band that can be used for outdoor fixed wireless broadband use. WISPA disagrees with the Commission's proposal to eliminate rules that allow equipment in the 5725-5850 MHz band to be certified under Section 15.247. WISPA concurs with the Commission's recommendation that enhanced security features in U-NII-2C devices will substantially mitigate harmful interference to Terminal Doppler Weather Radar ("TDWR") facilities, but disagrees that additional spectrum sharing techniques should be incorporated into U-NII-3 devices. WISPA also favors indefinite grandfathering of U-NII devices to avoid unnecessary and potentially costly equipment changes.

WISPA's members rely heavily on the 5 GHz U-NII and ISM bands to deliver fixed wireless broadband services to consumers who, in some cases, can only receive terrestrial broadband from wireless Internet service providers ("WISPs"). Given congestion and capacity constraints in existing unlicensed bands and the demand for fixed broadband services in rural areas where other broadband service is often not available, increasing the amount of unlicensed spectrum is perhaps the most important action the Commission can take. WISPA therefore is pleased that the Commission has timely initiated this proceeding with respect to the 195 megahertz of spectrum in the U-NII-2B and U-NII-4 bands, and has sought comment on various other rules across the 5 GHz band.

WISPA urges the Commission to move forward with the allocation of additional spectrum in the U-NII-2B and U-NII4 bands, subject to appropriate spectrum sharing techniques to enable co-existence with incumbent services. In the U-NII-2B band, the Commission should require Dynamic Frequency Selection ("DFS") to detect radar signals and to redirect

transmissions to other channels. In the U-NII-4 band, the Commission should protect earth station feeder links with geographic protection zones and explore ways by which unlicensed users can co-exist with any Dedicated Short Range Communications Service licensees.

WISPA also supports the Commission's proposal to allow outdoor operation of devices in the U-NII-1 band pursuant to the U-NII-3 rules. WISPs will benefit for the ability to use an additional 100 megahertz of spectrum, and existing certifiable equipment can be easily adapted to operate in this band. The Commission also should adopt its recommendation to include the 5825-5850 MHz segment in the U-NII-3 band. This additional 25 megahertz of spectrum can be a bridge between the U-NII-3 and U-NII 4 bands to create a contiguous block of 200 megahertz of spectrum for outdoor use.

WISPA takes issue, however, with the Commission's proposal to modify the rules for the 5725-5850 MHz ISM band in ways that would severely undermine the unique advantages of the band. The more flexible antenna gain permitted under the Section 15.247 ISM rules have enabled critical point-to-point services to be extended over greater. There is no information in the record or in the Commission's list of enforcement actions indicating that ISM band equipment has interfered with any TDWR facilities. Adopting the Commission's proposal would require WISPs to install less effective and efficient equipment and leave consumers without alternatives.

WISPA supports the Commission's proposal to require enhanced security features in U-NII-2C and U-NII-3 equipment to better protect TDWR facilities. WISPA believes that the record will show that manufacturers can implement these features without undue cost and that additional spectrum sharing techniques – other than DFS – would be inappropriate to protect incumbent users.

WISPA suggests that the proposed transition period be extended by 12 months, and that existing equipment be grandfathered indefinitely.

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The Wireless Internet Service Providers Association ("WISPA") hereby submits its Comments in response to the Notice of Proposed Rulemaking ("*NPRM*") adopted in the above-captioned proceeding.[1] As the trade association representing the interests of wireless Internet service providers ("WISPs") that rely heavily on the 5 GHz band to deliver fixed broadband services to millions of consumers, WISPA strongly endorses proposed rules that would enable commercial use of up to 195 megahertz of "new" spectrum and 125 megahertz of additional spectrum for outdoor use. Because the U-NII-2B and U-NII-4 bands are immediately adjacent to bands that are used by WISPs under rules that enable outdoor use, the availability of a significant amount of outdoor 5 GHz spectrum will help alleviate congestion and relieve capacity constraints to enable the delivery of additional broadband services.

Although the Commission's proposals generally offer many important benefits, WISPA opposes the Commission's proposal to change the rules for devices certified to operate in the 5725-5850 MHz Industrial-Scientific-Medical ("ISM") band under Section 15.247 of the

[1] Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, *Notice of Proposed Rulemaking*, ET Docket No. 13-49 (rel. Feb. 20, 2013) ("*NPRM*"). The *NPRM* was published in the Federal Register on April 10, 2013, which established May 28, 2013 as the deadline for the filing of initial Comments. *See* 78 Fed.Reg. 21320 (Apr. 10, 2013).

Commission's Rules. WISPA believes that requiring newly-certified U-NII devices to be more secure will ensure that interference to Terminal Doppler Weather Radio ("TDWR") facilities will be substantially mitigated if not altogether eliminated, while preserving rules that preserve unique operating advantages.

INTRODUCTION

WISPA is the trade association that represents the interests of WISPs that provide fixed wireless broadband services to consumers, businesses and first responders across the country. WISPA's members include more than 700 WISPs, equipment manufacturers, distributors and others. WISPA estimates that WISPs serve more than 3,000,000 people, many of whom reside in rural, unserved and underserved areas where wired technologies like DSL and cable Internet access services may not be available. In some of these areas, WISPs provide the only terrestrial source of fixed broadband access. In areas where other broadband options are available, WISPs provide a local access alternative that fosters competition in service, cost and features.

WISPs rely principally on unlicensed spectrum in the 900 MHz, 2.4 GHz and 5 GHz U-NII and ISM bands, along with "lightly licensed" spectrum in the 3650-3700 MHz band, to deliver fixed broadband services. These bands are shared with other WISPs, government agencies, industrial users such as smart grid companies, and consumer devices such as baby monitors, garage door openers, cordless telephones and home Wi-Fi networks. WISPs have demonstrated an ability to coordinate and share spectrum with other users through the use of

antenna cross-polarization, access point sectorization, voluntary databases[2] and other interference avoidance and mitigation techniques.

An informal poll of WISPA members showed that nearly all WISPs use some portion of the 5 GHz band for point-to-point connectivity or backhaul, point-to-multipoint service or a combination of both. In particular, the operating rules for the 5725-5850 MHz ISM band allow for affordable, wide-area deployment in areas where the 900 MHz and 2.4 GHz bands are too congested and the technical rules for the other 5 GHz bands are more restrictive. Accordingly, the ability of WISPs to preserve and continue to operate under the ISM rules in this band and to access additional spectrum in the 5 GHz band are of critical importance to WISPA.

Compared to licensed spectrum, the primary benefit of unlicensed and "lightly licensed" spectrum is that the spectrum access costs are lower and infrastructure deployment can occur much more rapidly. Although they do not obtain "exclusivity by rule," WISPs have been able to quickly deploy and expand broadband services because of the availability of reasonably-priced, innovative, license-free equipment. The ability of WISPs to deploy service to over 3,000,000 people in 15 years using unlicensed spectrum is one of the Commission's true success stories, as the Commission acknowledged in the National Broadband Plan.[3] Despite many challenges, in the past few years WISPs have greatly expanded their coverage areas and subscribership. WISPA estimates that, in the last year alone, over 500,000 new customers in the United States have begun receiving fixed wireless broadband service from WISPs, a testament to innovation,

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[2] *See, e.g.*, Memorandum from Julius Knapp, Chief, Office of Engineering and Technology, and P. Michele Ellison, Chief, Enforcement Bureau, to Manufacturers and Operators of Unlicensed 5 GHz Outdoor Network Equipment (July 27, 2010) (*available at* http://www.spectrumbridge.com/Libraries/Misc_docs/FCC_Memorandum_on_UNII_Device_Operartion.sflb.ashx) (acknowledging availability of WISPA database for voluntary registration of Part 15 operations in 5 GHz bands that are shared with Terminal Doppler Weather Radio facilities).

[3] *See* National Broadband Plan, 50 CR 1, 94 (rel. Mar. 16, 2010).

competitive equipment pricing and features and consumer demand. This growth is expected to continue.

In the *NPRM*, the Commission proposes to allow "new" spectrum in the 5350-5470 MHz (U-NII-2B) and 5850-5925 MHz (U-NII-4) bands to be used on an unlicensed basis subject to sharing requirements with incumbent users. The Commission also proposes to modify its technical rules to enable higher-power outdoor operations in the 5150-5250 MHz (U-NII-1) band. WISPA supports these proposals. However, WISPA opposes changes to the ISM certification and operating rules and comments on the Commission's proposals to mitigate the potential for interference in other 5 GHz bands. WISPA supports a longer transition period and indefinite grandfathering of existing devices.

DISCUSSION

I. THE COMMISSION SHOULD ALLOCATE ADDITIONAL SPECTRUM FOR FIXED OUTDOOR USE.

According to the Commission, there are approximately 19 million Americans that do not have access to fixed broadband services.[4] The Commission stated in the *Eighth Broadband Report* that:

> Approximately 14.5 million of the 19 million (or 76 percent) Americans without access to fixed broadband meeting the speed benchmark reside in rural areas. In comparison, 4.5 million of the 19 million (or 24 percent) of Americans living in non-rural areas are without access to these services. The percentage of Americans without access in rural areas is 23.7 percent as compared to 1.8 percent in non-rural areas. These figures indicate that nearly one in four rural Americans lack access to fixed broadband meeting our speed benchmark. These data reflect that

[4] *See Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, Eighth Broadband Progress Report, 27 FCC Rcd 10342, 10370 (2012) ("*Eighth Broadband Report*"); *In the Matter of Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, WC Docket No. 10-90, *et al.* (rel. Nov. 18, 2011), ¶ 4, n.3.

> rural Americans are more than thirteen times more likely to lack access to fixed broadband than Americans in non-rural areas.[5]

In recently adopting rules for its Rural Broadband Access Loan and Loan Guarantee Program, the Rural Utilities Service agreed with this assessment, stating that:

> Analysis suggests that rural economies benefit generally from broadband availability. In comparing counties that had broadband access relatively early (by 2000) with similarly situated counties that had little or no broadband access as of 2000, employment growth was higher and nonfarm private earnings greater in counties with a longer history of broadband availability. By 2007, most households (82 percent) with in-home Internet access had a broadband connection. A marked difference exists, however, between urban and rural broadband use – only 70 percent of rural households with in-home Internet access had a broadband connection in 2007, compared with 84 percent of urban households. The rural-urban difference in in-home broadband adoption among households with similar income levels reflects the more limited availability and affordability of broadband in rural settings.[6]

With access to additional non-exclusive, unlicensed spectrum, WISPs would be extremely well positioned to expand their coverage areas and to initiate service to those consumers and businesses that currently lack access to fixed broadband services.

In the *NPRM*, the Commission correctly observes that "[w]ireless broadband services are in high demand by the public and that demand is expected to grow significantly in the coming years. Increasingly, U-NII devices have played a key role in meeting some of that demand, particularly U-NII devices used for wireless local area networking and broadband access."[7] WISPs currently rely on the U-NII-2A, U-NII-2C, U-NII-3 and ISM bands to provide fixed broadband services, and have invested millions of dollars of private funds to design, construct and operate broadband networks that serve hundreds of thousands of customers. Providing WISPs with the ability to access additional spectrum in the 5 GHz band is perhaps the best thing

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[5] *Eighth Broadband Report* at 10370 (footnotes omitted).
[6] Rural Broadband Access Loans and Loan Guarantees, RIN 0572–AC06, 78 Fed. Reg. 8353, 8353 (Feb. 6, 2013).
[7] *NPRM* at ¶ 15.

the Commission can do to enable fixed broadband services to be extended to more people in rural, unserved and underserved areas.

The Commission proposes to allow outdoor use of unlicensed devices in additional U-NII bands. WISPA enthusiastically supports most of these proposals, with one important exception – ensuring that existing high-gain antenna systems can continue to be used in the 5725-5850 MHz ISM band. Overall, WISPA believes that the goal of harmonizing the equipment certification and technical rules across the entire 5150-5925 MHz band is laudable, but should not be implemented at the expense of existing broadband users. Rather, as described herein, the Commission should adopt baseline rules as a core principle, and allow for greater flexibility and more permissive spectrum sharing techniques when the circumstances of a particular U-NII or ISM sub-band permit.[8]

A. The Commission Should Allow Unlicensed Operations in the U-NII-2B Band.

The Commission asks whether and to what extent unlicensed operations in the 5350-5470 MHz (U-NII-2B) band can be shared with federal and non-federal operations. The Commission asserts that the incumbent operations bear similarities to radar and other incumbent operations in the adjacent U-NII-2A and U-NII-2C bands. Existing U-NII operations in these bands already employ Dynamic Frequency Selection ("DFS") to avoid causing harmful interference to federal systems.[9]

WISPA urges the Commission to allow unlicensed outdoor operations in the U-NII-2B band. The inclusion of 120 megahertz of additional spectrum would create significant benefits for WISPs that require additional spectrum to help relieve congestion and capacity constraints in other unlicensed bands. WISPA agrees with the Commission's suggestion that U-NII devices in

[8] WISPA's proposed plan for the 5 GHz band is summarized in the table that appears in Appendix A hereto.
[9] *See NPRM* at ¶ 98.

this band could operate under the 250 mW transmitter power limits established in Section 15.407(a)(2) to create 475 megahertz of contiguous spectrum – from 5250 MHz to 5725 MHz – operating indoors or outdoors under the same regulatory regime. The addition of U-NII-2B spectrum will encourage more manufacturers to enter the marketplace and offer competitive and innovative products, which will help drive broadband adoption.

For avoidance of interference to federal and non-federal incumbents, the Commission should require unlicensed U-NII-2B devices to employ DFS technology.[10] DFS is already required in the adjacent bands to detect radar signals and to redirect transmissions to other available channels. As the Commission points out, the "signal detection technology currently used by U-NII-2A and U-NII-2C DFS devices senses radar signals whose parameters . . . are well-known and can be used to improve signal detection."[11]

B. The Commission Should Allow Unlicensed Operations in the U-NII-4 Band.

The Commission similarly asks whether it should allow unlicensed operations in the 5850-5925 MHz (U-NII-4) band and, if so, what certification and technical rules should be adopted.[12] The Commission suggests that the U-NII-4 rules can be paired with the U-NII-3 rules to create a contiguous block of 200 megahertz of spectrum from 5725 MHz to 5925 MHz operating under similar technical rules.[13]

WISPA urges the Commission to allow unlicensed operations in this band as well, on a shared basis with existing users. The Commission also should adopt its proposal to apply the rules set out in Section 15.407(a)(3) so that operations in the U-NII-3 and U-NII-4 bands can be

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[10] *See id.*
[11] *Id.* at ¶ 99. WISPA anticipates that equipment manufacturers and the technology community will submit Comments addressing the capabilities, costs and limitations of incorporating DFS technology into U-NII-2B devices.
[12] *See id.* at ¶ 97.
[13] *See id.*

combined. As discussed *infra*, however, WISPA also proposes retention of the existing certification and technical rules for the 5725-5850 MHz ISM band. This would allow WISPs to optionally deploy either U-NII-3 or U-NII-4 equipment from 5725-5925 MHz or ISM equipment from 5725-5850 MHz, and would afford existing and future users of the 5725-5850 MHz ISM band the flexibility to continue to operate with ISM-certified equipment and higher gain antennas to enable broadband services, especially backhaul and other point-to-point links, to continue to be delivered over greater distances.

Among other services, the 5850-5925 MHz band is allocated to the Dedicated Short Range Communications Service ("DSRC").[14] Notwithstanding the fact that this service was established in 1999, there appear to be only seven active non-exclusive licenses and *no* registered Road Side Units ("RSUs").[15] Accordingly, there are serious questions concerning whether the DSRC service should remain or if the spectrum (or some portion of it) should be re-allocated for other purposes. WISPA appreciates that DSRC technology is evolving and is interested in exploring ways in which this band can be effectively shared.

WISPA further believes that DFS will enable U-NII-4 band operators to detect radar signals and thereby ensure that such systems can be protected from interference. For extended C-band uplink facilities authorized in the band, WISPA suggests that the Commission establish protection zones around such facilities, and adopt professional installation requirements so that unlicensed facilities are not constructed inside of the protection zones.

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[14] *See id.* at ¶ 93.
[15] *See* Section 90.375(b).

C. The Commission Should Permit Outdoor Use in the U-NII-1 Band Pursuant to the U-NII-3 Rules.

Under rules adopted in 1997, the 5150-5250 MHz (U-NII-1) band is restricted by power and other limitations to indoor operation.[16] The Commission seeks comment on whether it should allow outdoor use of this band and, if so, whether the power and power spectral density ("PSD") limits should be harmonized with the rules applicable to the U-NII-2A band or, alternatively, to the U-NII-3 band.[17]

WISPA urges the Commission to permit outdoor operations in the U-NII-1 band under the U-NII-3 rules. This additional 100 megahertz for outdoor use will increase the amount of spectrum that WISPs and others can use to deliver broadband services to consumers. Given existing congestion and capacity constraints in other unlicensed bands, it is imperative that additional spectrum resources be available for outdoor operations.

The U-NII-3 rules authorize devices with higher power and higher PSD limits than do the U-NII-2A rules. The U-NII-3 rules therefore enable greater coverage and distances than do the rules for the U-NII-2A band, making it, as discussed elsewhere in these Comments, a very attractive band for WISPs because of the unique advantages those rules provide. Moreover, technology for rapid development and certification of outdoor U-NII-1 devices for deployment under the U-NII-3 rules already exists, so outdoor operations in the band could commence without the need to create a whole new equipment ecosystem. In addition, having two bands – the U-NII-1 and the U-NII-3 bands – allocated for higher gain point-to-point antennas increases operational flexibility and actually reduces interference through the use of narrower-beamwidth antennas.

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[16] *See NPRM* at ¶ 36.
[17] *See id.* at ¶¶ 39-40.

In addition, it is not necessary for the rules across the entire 5 GHz band to be 100 percent harmonized, especially given the existing higher-power operations and the need to protect different kinds of incumbents. Rather, harmonization should be viewed as part of a process that leads to more efficient spectrum utilization to enable faster and more reliable broadband delivery. Where there are already disparate rules and vibrant ecosystems in multiple sub-bands, complete harmonization of the rules across all of the sub-bands is not possible without disrupting existing operations, a result the Commission obviously should want to avoid. As the Commission observes in discussing the benefits of the U-NII-3 rules, "these changes would permit for wider bandwidth devices that would not rely on contiguous spectrum under the new Wi-Fi standards . . . and would permit the introduction of more outdoor access points for broadband use."[18] WISPA believes that there should be a harmonized baseline set of rules across all of the 5 GHz bands, with greater flexibility for the U-NII-1 and U-NII-3/ISM bands and DFS requirements in the U-NII-2 and U-NII 4 bands.

For example, devices certified in the U-NII-1 band could be used under the more restrictive power and PSD limits of the U-NII-2A band as well as the more permissive power and PSD limits of the U-NII-3 band. Thus, those users that desire to operate on a contiguous block of spectrum under the same rules – the U-NII-1 and U-NII-2A bands – can do so, and those that want to obtain the benefits of higher power and higher PSD limits can choose to operate under the more permissive U-NII-3 rules without the benefit of contiguous spectrum. Thus, users desiring wider channel sizes would be able to combine their U-NII-1 and U-NII-2A operations. This flexibility would also help drive innovation in equipment development.

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[18] *Id.* at ¶ 40.

WISPA also understands the need to protect incumbent licensed operations in the U-NII-1 band and the adjacent band below 5150 MHz.[19] To protect feeder links in the 5096-5250 MHz band, WISPA suggests that the Commission establish protection zones around the limited number of feeder link earth stations to provide adequate protection to their operations.[20] Because incumbent operations are identifiable and fixed, it is not necessary for the Commission to require DFS or other sharing mechanisms in this band. WISPA acknowledges, however, that U-NII-1 facilities would not be subject to registration requirements such as those that exist in Section 90.1307 for fixed operations in the 3650 MHz Service.[21] Accordingly, so that unlicensed operations do not cause harmful interference inside designated protection zones, the Commission could include a professional installation requirement. The professional installer would bear responsibility for ensuring that, absent agreement with the earth station licensee, no U-NII-1 facilities were constructed inside a designated protection zone.

For adjacent-channel protection,[22] WISPA believes that the Commission can establish appropriate out-of-band emission limits at 5150 MHz to ensure that U-NII-1 devices do not interfere with microwave landing systems operating in the band immediately adjacent to the U-NII-1 band. WISPA also believes that the Commission can adopt appropriate out-of-band emission limits for both U-NII-1 devices and any operations that may be authorized in the pending proceeding to protect the 5091-5150 MHz band for Aeronautical Mobile Telemetry from adjacent-channel interference.

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[19] *See id.* at ¶ 38.

[20] Commission records indicate that there are only five locations where earth stations are currently authorized. Globalstar and its subsidiaries have authorized facilities at Wasilla, AK; Sebring, FL; Clifton, TX; and Cabo Rojo, PR. Denali 20020, LLC holds an authorization in the 5150-5250 MHz band for earth station facilities at Brewster, WA. Given the directional antennas utilized for earth-to-space communications, neither the earth stations nor the satellites are likely to experience interference from lower-power WISP operations. Accordingly, the protection zones should be relatively small in size.

[21] Earth station licensees should be required to negotiate in good faith with any U-NII-1 band user that desires to operate within the protection zones, in a manner similar to the requirements of Section 90.1331.

[22] *See NPRM* at¶ 38.

D. The Commission Should Extend the U-NII-3 Band to 5850 MHz.

The Commission discusses the disparity between the U-NII rules applicable to the 5725-5825 MHz U-NII-3 band and the ISM rules applicable to the 5725-5850 MHz ISM band.[23] The Commission proposes to extend the upper edge of the U-NII-3 band from 5825 MHz to 5850 MHz to match the amount of available spectrum for devices certified under Section 15.247. The Commission believes that this change would eliminate the complexity and costs associated with multiple-part rule certifications for technically similar devices, and will not increase the potential for harmful interference because the 25 megahertz extension is already authorized by Section 15.247.[24]

WISPA believes that adding more 5 GHz spectrum for unlicensed outdoor use would benefit the public interest, and urges the Commission to extend the U-NII-3 band to include the 5825-5850 MHz spectrum. The addition of 25 megahertz of spectrum between the U-NII-3 and U-NII-4 bands will act as a bridge and create a contiguous spectrum block that WISPs and others can use to provide broadband service to the public.

II. THE COMMISSION SHOULD RETAIN THE TECHNICAL AND OPERATING RULES OF SECTION 15.247 FOR THE 5725-5850 MHz FREQUENCY RANGE.

As described above, WISPs rely heavily on the 5725-5850 MHz ISM band for point-to-point backbone links between communities needing broadband access and, in some cases, for point-to-multipoint services to end users. Because devices in this band are certified pursuant to Section 15.247, WISPs are able to obtain the benefits of higher antenna gain on point-to-point links to serve locations and areas that would be unreachable using any other unlicensed bands including the other 5 GHz bands. In many cases a WISP would be unable to provide broadband access to distant communities using a link operating under the more stringent requirements of

[23] *See id.* at ¶ 24.
[24] *See id.* at ¶ 27.

Section 15.407, but can do so under the more permissive rules set out in Section 15.247. WISPA believes that nearly every WISP, especially those that serve remote and rural areas where other broadband services would otherwise not be available, utilize point-to-point ISM band equipment with antenna gains higher than 23 dBi, as permitted under Section 15.247.

In the *NPRM*, the Commission proposes to consolidate digital equipment authorizations for the 5725-5850 MHz ISM band under the more restrictive provisions of Section 15.407.[25] The Commission offers two reasons for suggesting these changes. First, the Commission seeks to more closely conform the rules for this band to the rules proposed and in place for other U-NII bands.[26] Second, the Commission apparently believes that the proposed antenna gain limitation will help mitigate interference to TDWR facilities in the 5600-5650 MHz band caused by illegally modified equipment certified to operate in the 5725-5825 MHz U-NII-3 and the 5725-5850 MHz ISM band. The Commission states that illegal equipment modifications "have resulted in non-compliant devices creating interference scenarios that were not anticipated when the U-NII rules were created."[27]

WISPA respectfully submits that the Commission's rationale with regard to TDWR interference is incorrect for the following reasons. First, higher-gain antennas incorporated in ISM equipment in the 5725-5850 MHz band could in no way contribute to interference to TDWR facilities in the 5600-5650 MHz range because of the 75 MHz (or more) of frequency separation between the top of the TDWR band at 5650 MHz and the bottom of the ISM band at 5725 MHz. Second, higher-gain antennas achieve their extra gain by narrowing their antenna beamwidth. This narrower antenna beamwidth actually *decreases* the likelihood of interference of all kinds. The narrower beamwidth is *less likely* to impinge upon any antenna other than the

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[25] *See id.* at ¶ 28.
[26] *See id.*
[27] *Id.* at ¶ 25.

desired receiving antenna. Third, there is no evidence in the record of any ISM band point-to-point link ever causing any interference to any TDWR system. The NTIA reports cited in the *NPRM* contain no evidence of any ISM band transmissions interfering with TDWR operations. Fourth, a review of Commission TDWR enforcement actions shows no instance of any ISM band interference to TDWR facilities.[28]

Given the dual advantages of longer distance and less interference that the rules in Section 15.247 for the 5725-5850 MHz ISM band make possible, harmonization of the ISM band with the other U-NII bands band would be counterproductive and contrary to the public interest. WISPs would lose the ability to serve existing consumers in distant communities, many of whom would be left with no terrestrial broadband options given the unavailability of wireline and cable platforms. For example, many WISPs report that they use ISM antennas with gains of 30-40 dBi to serve distant communities. Comparing an ISM antenna with 35 dBi gain to a U-NII-3 antenna with 23 dBi gain reveals that the ISM-band link can extend for four times the distance (all other link parameters being equal). Every 6 dBi of antenna gain allows the link distance to be doubled. In this case, the 12 dBi of additional antenna gain allows the link distance to be doubled twice – for an increase in link distance of four times. The 5725-5850 MHz ISM band is the only existing 5 GHz band that enables such long-distance point-to-point links, a benefit that would be lost through a misguided attempt to harmonize rules that should not be harmonized. Whether intended or not, the Commission must understand these consequences.

Moreover, a number of manufacturers produce equipment that is designed to operate under the Section 15.247 rules,[29] and changing the certification requirements would actually

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[28] *See* http://www.fcc.gov/encyclopedia/weather-radar-interference-enforcement (last visited May 28, 2013).

[29] Commission records indicate that there are 9,700 devices certified under Part 15.C of the Commission's Rules (for ISM devices), and 1,259 devices certified under Part 15.E of the Commission's Rules (for U-NII devices) in the 5725-5825 MHz band.

eliminate successful product lines and chill future competition. If the rules are changed, equipment supplies for replacement of existing services would dry up and support of product lines would disappear. Over time, these market forces – the inevitable outcome of an ill-conceived rule change – would dismantle an ecosystem that provides WISPs with unique wireless service capabilities, consumers with affordable broadband and equipment manufacturers and vendors with a mature product line.

In addition, WISPA does not understand why it is necessary to fundamentally alter the service and equipment landscape in the 5725-5850 MHz ISM band to address a problem caused exclusively by illegal operations of U-NII equipment. Instead, as the Commission proposes for the U-NII-2C band, the Commission should require equipment manufacturers to add security features that will make both U-NII and ISM devices less susceptible to unauthorized operations. Based on communications with its members, WISPA believes that equipment manufacturers can produce equipment that will make it impossible for users to illegally modify equipment to enable non-DFS operations in the 5600-5650 MHz band.[30] Subject to confirmation in the record, WISPA therefore would not object to the imposition of more stringent security features to be installed in equipment as an alternative to adopting the much more severe antenna-gain restrictions proposed in the *NPRM* which negatively affect broadband delivery to distant communities. Telling the vast majority of legitimate and compliant users that they must terminate service to existing subscribers because of the illegal actions of a few users contradicts sound policy and punishes the wrong people.

Finally, there is no reason why the U-NII-3 band and the ISM band rules cannot continue to coexist in parallel. No one is actually disadvantaged by having two sets of certification and operating requirements in the 5725-5850 MHz spectrum – not the equipment manufacturers, not

[30] *See* Part III, *infra*.

the WISPs, not the end-users and not the Commission, because the dual rules and dual certification procedures already exist. The ISM band isn't "broken," so it makes no sense to try to "fix" it and, in the process, to "break" it.

III. THE COMMISSION SHOULD CONSIDER REQUIRING EQUIPMENT MANUFACTURERS TO INCORPORATE ADDITIONAL SECURITY FEATURES IN U-NII-2C DEVICES TO MITIGATE THE POTENTIAL FOR INTERFERENCE TO TDWR FACILITIES.

The Commission discusses interference issues that have arisen with respect to TDWR facilities.[31] WISPA appreciates that this has been a problem over the years, and has assisted the Commission in helping to identify and remedy illegal operations. Along with other representatives from the technology, manufacturing and operating sectors, WISPA participated in many meetings with the Commission, FAA and NTIA to discuss and investigate methods by which interference could be mitigated and new devices certified. Perhaps most significantly, WISPA agreed to establish a voluntary database by which users of U-NII-2C devices could register their operations.[32] By using this database, government officials can determine the location and other operating characteristics of U-NII-2C operations in close geographic and spectral proximity to TDWR facilities to make it easier to identify and eliminate potential sources of harmful interference.

The Commission notes that, in some cases, U-NII equipment that complies with the certification and operating requirements can cause interference to TDWR facilities "due to a variety of factors such as the configuration of the transmitter, its height and azimuth relative to the TDWR, and the device's failure to detect and avoid the radar signal."[33] The Commission also observes that, in many cases, devices causing interference were not certified to operate in

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[31] *See NPRM* at ¶¶ 42.
[32] *See id.* at ¶ 48; note 2, *supra.*
[33] *Id.* at ¶ 43.

the United States or were unlawfully modified.[34] The Commission explains that such modification is caused "[t]ypically . . . by operators of the devices, but manufacturers have produced equipment that is easily modified, especially through software changes, to permit devices to operate in non-compliant modes."[35] To prevent interference from occurring, the Commission proposes "to require that manufacturers implement security features in any digitally modulated device capable of operating in the U-NII bands, so that third parties are not able to reprogram the devices to operate outside the parameters for which the device was certified."[36]

Based on input it has received from equipment manufacturers, WISPA believes that security features can be incorporated into U-NII devices with little technical difficulty. WISPA further believes, subject to confirmation in the record, that any incremental cost to "harden" devices will be more than offset by increased sale and production of U-NII devices designed to operate under a baseline set of technical requirements.

WISPA does not agree that the Commission should mandate any other additional security measures at this time. A geolocation database would require significant complexity and expense to integrate and would not be effective for U-NII equipment that was not directly connected to the Internet to access the database. In addition, a database would not protect incumbent, mobile users because the database would not know and contain information about their geographic locations. WISPA plans to maintain the existing manual registration database it voluntarily established, and will continue to educate its members on the benefits of database registration, "best practices" and compliance with interference protection requirements. This database can be updated to account for the likelihood that larger channel sizes, necessitating larger frequency separation from TDWR facilities, will be used in the future.

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[34] *See id.*
[35] *Id.* at ¶ 44.
[36] *Id.* at ¶ 51.

IV. THE COMMISSION SHOULD ADOPT RULE CHANGES TO IMPROVE THE UTILITY AND RELIABILITY OF DYNAMIC FREQUENCY SELECTION IN THE U-NII-2A AND U-NII-2C BANDS.

In addition to proposing enhanced security features in U-NII-2C devices (discussed above), the Commission proposes changes to its DFS requirements to help ensure that incumbent government and military radar systems are better protected from interference.[37] DFS is a widely used interference mitigation technique that is appropriate for detection of intermittent radar signals, and its use should be encouraged over other interference techniques that would be expensive to incorporate or would overprotect incumbent services and thereby reduce spectral efficiency. That said, DFS is not without its limitations. Some of these limitations can be addressed by manufacturers that can, in cooperation with the Commission and NTIA, and within a reasonable transition period, add improved functionality. Manufacturers can be expected to have the incentive to improve DFS technology if additional spectrum is made available to encourage new entrants and new product lines to enter the marketplace.

WISPA supports adoption of the revised Bin-1 test procedures set out in Appendix B to the *NPRM*. The proposed procedures reflect the input of industry. WISPA looks forward to the contributions to the record that manufacturers and standard-setting organizations will file in this proceeding before commenting on other aspects of the Commission's proposals to change the DFS requirements.

V. THE COMMISSION SHOULD ALLOW AT LEAST TWO YEARS BEFORE ITS NEW CERTIFICATION RULES ARE EFFECTIVE AND SHOULD GRANDFATHER EXISTING EQUIPMENT AND ISM OPERATIONS.

The Commission proposes that manufacturers be afforded 12 months following the effective date of new rules to comply with any new equipment certification rules the

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[37] *See id.* at ¶ 67.

Commission adopts in this proceeding. For an additional 12-month period, manufacturers could make Class II permissive changes to equipment certified before the effective date.[38] WISPA believes that these periods should be extended by 12 months to allow the equipment industry to have more time to comply with the new Bin 1 testing requirements and incorporate DFS and other technology into new and existing devices. Further, this additional time would enable new entrants to have time to begin development of new products that would provide competition to other devices, a result that serves the public interest.

WISPA also strongly favors grandfathering of existing U-NII and ISM devices indefinitely.[39] As the Commission correctly observes, "[r]equiring the immediate upgrade or replacement of existing equipment would be a financial burden on operators of these devices. We believe that grandfathering equipment that is installed and operating will ensure that entities will be permitted to operate their existing U-NII devices until replacement is necessary or desired due to age, malfunction, or other concerns."[40] For bands where devices have been certified under existing testing procedures and deployed without the security features the Commission may adopt in this proceeding, existing devices should not be required to be removed from operation. Imposing such a requirement would impose unnecessary costs and burdens on WISPs and other users. In some cases, the costs to change out equipment could be prohibitive, forcing WISPs to slow growth, terminate service to existing customers or, at worst, go out of business.

By preserving the ISM rules for the 5725-5850 MHz band, the Commission would effectively grandfather existing ISM devices and also maintain a vibrant equipment ecosystem for new devices in the future. If, however, the Commission does not preserve the ISM rules for the 5725-5850 MHz band, it should grandfather existing devices indefinitely for the reasons

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[38] *See id.* at ¶ 114.
[39] *Id.* at ¶ 115.
[40] *Id.*

discussed above and, in recognition of the unique advantages the ISM rules afford, to enable WISPs and others to provide broadband backhaul to distant communities.

CONCLUSION

Demand for fixed broadband services can be met by making additional spectrum in the 5 GHz band available for unlicensed use, with spectrum sharing techniques such as DFS, protection zones and professional installation requirements to ensure that facilities entitled to interference protection receive it. The Commission should be careful, however, to avoid harmonizing its rules at the expense of the thousands of users and devices that currently operate under existing rules that afford operational flexibility to WISPs and other users. The addition of a significant amount of new shared spectrum will help foster a vibrant and competitive equipment industry that will enable millions of consumers to receive affordable fixed broadband services.

Respectfully submitted,

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Appendix A

Proposed 5 GHz Band Plan

Band	U-NII-1	U-NII-2A	U-NII-2B	U-NII-2C	U-NII-3	ISM	U-NII-4
Spectrum	5150-5250	5250-5350	5350-5470	5470-5725	5725-5850	5725-5850	5850-5925
Maximum Conducted Output Power	1 Watt	250 mW	250 mW	250 mW	1 Watt	1 Watt	1 Watt
EIRP: (Output Power and Antenna Gain)	+ 36 dBm (+ 30 dBm - 6 dBi); 23 dBi maximum gain limit for PTP	+ 30 dBm (+ 24 dBm - 6 dBi) PMP; 23 dBi maximum gain limit for PTP	+ 30 dBm (+ 24 dBm - 6 dBi)	+ 30 dBm (+ 24 dBm - 6 dBi)	+ 36 dBm (+ 30 dBm - 6 dBi); 23 dBi maximum gain limit for PTP	+ 36 dBm (+ 30 dBm - 6 dBi); no maximum gain limit for PTP	+ 36 dBm (+ 30 dBm - 6 dBi); 23 dBi maximum gain limit for PTP
Sharing	Protection zone; prof. installation; and OOBE	DFS; TPC	DFS	DFS; TPC; enhanced security features; protection zones; and prof. installation	Enhanced security features	Prof. installation	DFS; TPC; protection zones; and prof. installation